

THE LEISURE HOUR.

A FAMILY JOURNAL OF INSTRUCTION AND RECREATION.

"BEHOLD IN THESE WHAT LEISURE HOURS DEMAND,—AMUSEMENT AND TRUE KNOWLEDGE HAND IN HAND."—*Couper.*



CARD GAMBLING.

ROGER KYFFIN'S WARD.

CHAPTER VIII.—THE YOUNG HEIRESS.—HARRY COMES OUT IN LONDON NOT UNDER THE BEST OF AUSPICES.

DR. MUSGRAVE threw himself into his arm-chair, and crossing his legs, with a frown of thought on his brow, looked over Mr. Jessop's notes.

"I will go down to-morrow," he said, turning to Paul, who stood before him eagerly watching his countenance, as if he could there read the probable fate of his beloved young mistress. "I cannot possibly go

to-day; I may be of some use, but it is doubtful. However, I will send a medicine which may be efficacious, and suggest to Mr. Jessop how he may treat the young lady."

"Oh! sir, cannot you come, cannot you save her?" exclaimed Paul, not understanding what the doctor had said, but only making out that he was unable to accompany him back.

"Yes, yes, my friend," answered the doctor, touched by the old soldier's earnestness. "To-morrow I'll start. I must go in a post-chaise, I can-

not ride express as you do. Now go down, and my man Mumford will attend to your wants while your horse is fed. In the meantime, I will look out the medicines, and write a letter to my good friend Mr. Jessop. Will that satisfy you? Now do go, my good man, do go."

Paul could with difficulty get down any food, but at the same time his experience told him that when work was to be done the body must be fed.

He thought the doctor was a long time in concocting the medicine, but hoped that it would be more efficacious in consequence.

When once mounted, with the medicine in a case slung at his back, he did not spare his steed. His only fear was falling. A horse had been sent on to Winchester to meet him. He exchanged it for his tired steed. Winchester was soon passed through and Southampton reached. Shortly after leaving the latter place, he encountered Harry Tryon, with a led horse, coming to meet him. He mounted it gladly, for his own was already tired, and together they galloped back through the forest.

Harry was afraid that Miss Lucy was worse. At all events, they were anxiously looking out for the doctor or his remedies. The Colonel met them at the hall-door steps. His face was very grave and anxious. He was disappointed at not seeing the doctor, but eagerly took the case of medicines.

"Paul, you saved my life once, and by God's providence you may be the means of saving my daughter's. His will be done, whatever happens."

Mr. Jessop was in attendance. The remedies sent by the London doctor were administered, but Lucy was very weak. Harry asked Mr. Jessop what he thought.

"My boy, doctors at all times must not express their thoughts," he answered, evasively. "Miss Everard is young, and youth is a great thing in a patient's favour. Remember that, and make a good use of yours while you enjoy it."

The guests with sad hearts took their departure. The long-expected ball was not to be. Messages were sent round to the residents in the neighbourhood, informing them that the ball was put off, but in the evening several who had not heard of what had occurred arrived at the door. The Colonel went down to speak to them himself. It was with difficulty he could command his voice, for he saw, with the eye of affection, that his beloved daughter was struck by the hand of death. Among others, a party of foreign officers arrived from a neighbouring town. Captain Everard begged his uncle that he might be allowed to go and speak to them. Refreshments had been placed for those who might come from a distance, and they were accordingly invited in. They were gentlemanly men, and Captain Everard received them as a man of the world. Having mentioned the serious illness of Miss Everard, he at once turned the conversation to other subjects. Among the guests, he saw one whose face was familiar; he looked at him again and again, and was trying to consider where he had seen him. The officer at length became aware that Captain Everard's eyes were fixed on him.

"Surely we have met before," said the latter. "Was it not at Toulon?" A deep melancholy came over the foreigner's countenance.

"It may be, for I was there once," he answered; "would that I had died there too; but my life was saved by a brave English officer, who, at the risk of

his own, carried me away amid showers of musketry poured down upon us by my countrymen, and amidst exploding ships, and masses of burning ruin which showered down upon our heads. Tell me, sir, are you that officer? for as you know well, my mind was unhinged by the dreadful events of that night, and though I have a dim recollection of his features, if you are he, you will recollect that I had scarcely recovered when he was compelled to send me to the hospital."

"Yes, indeed," cried Captain Everard, "I had the satisfaction of saving the life of a French officer in the way you describe. Captain Rochard, I understood, was his name, and although he remained several weeks in my cabin, all that time he was scarcely conscious of what was taking place around him."

"Yes, yes, I am the very man," exclaimed the foreign officer, rising from his seat, and taking Captain Everard's hand in his own. "Let me now express my gratitude to you, which I was at that time unable to do. I have since then lived a chequered and adventurous life, and though I dare not contemplate the past, I feel that there is still pleasure and satisfaction to be found in the present. While a spark of hope remains in the bosom of a man, he cannot desire death."

The other officers seemed much interested at the meeting between their friend and the English captain. Captain Rochard, they said, had joined them, and one or two had known him formerly when he was in the French marine, and they were conning that he would do credit to their corps.

Harry Tryon had come to the house twice before in the day to inquire for Lucy; he now returned with the Baron de Ruvigny, who really looked dejected and almost heartbroken at the illness of the young lady. Harry had exchanged a few words with Mabel; they were parting words, so we must not too curiously inquire into what was said. He had been, however, anxious to remain a few days longer, but Lady Tryon insisted on setting off the next day for London. He once more rejoined the Baron at the hall door. He found him standing with the foreign officers, whom he had invited to spend the rest of the evening at Lynderton. Harry was of course asked to join the party. Captain Everard was parting from them at the hall-door, and as the light fell on Captain Rochard's features Harry was sure that he was an old acquaintance. Captain Rochard dropped a little behind his companions as they walked down the avenue, and Harry took this opportunity of addressing him.

"We have met before, Captain Falwasser," said Harry; "I am sure that I am not mistaken, and you were very kind to me on one occasion when I was a boy."

"Ah!" answered the Captain, with a start, "that was my name; I will not deny it; that is to say, it was my name for a time, and it may be my name again; but at present I must beg you will know me as Captain Rochard, the friend of your relative—is he not? Captain Everard."

"I will be careful to obey your wishes, Captain Rochard," said Harry; "but Captain Everard is not a relative."

Harry felt himself blushing as he said this, for he certainly hoped that he might be so some day. Harry felt very curious to know who this Captain Rochard could possibly be. He had known him, apparently,

as the commander of a smuggler; now he found him in the character of a military officer. "Perhaps, after all, he may be neither one nor the other," thought Harry; "there is a peculiarly commanding and dignified air about him."

The evening was spent very pleasantly, for although the young Baron was sad at heart, he endeavoured to overcome his feelings, for the sake of entertaining his guests, and music and pleasant conversation made the hours pass rapidly away. The officers of the foreign legion had neither the inclination nor the means of imitating the example of British military officers, who at that time, and on such an occasion, would have spent the evening in a carouse. A few glasses of lemonade was probably the extent of the entertainment afforded by the host, or expected by the guests.

The next morning Harry found himself on the box of Lady Tryon's coach, rumbling away towards London. Her lady's-maid was inside. The footman sat on the box with Harry. Even the beautiful forest scenery through which they passed failed to raise Harry's spirits. He was constantly looking back in the hopes of catching a glimpse of the chimneys of Stanmore; not that he could really have seen them, by-the-by, but his heart flew, at all events, in the direction of his eye. He thought, too, of dear sweet Lucy lying on her sick-bed, too likely, he feared, to prove her death-bed.

The road was none of the best in those days, and Harry and the footman had often to get off and help the carriage along. This was a relief, however. They each had a brace of pistols, and a blunderbuss was strung at the back of the box. Harry, however, had a strong suspicion that Simon, the footman, would be very unwilling to use it, even in defence of the matured charms of Miss Betsy Frizzle, her ladyship's much suffering and much enduring handmaiden. Sometimes the journey occupied three days, but her ladyship was in a hurry, and her carriage being unusually light, and the roads in tolerably good order, they were only to sleep one night on the road.

Harry had been so constantly away from home for the last few days, that he had had no conversation with his grandmother. As they were seated at tea in their inn, the old lady again spoke of his marriage with Mabel.

"I told you, Harry, that the Colonel's daughter would die. I knew it long ago. I saw it in her eye, and her voice told me that she was not to live many years in this world. Thus, mark me, Miss Mabel will become the mistress of Stanmore. Now, Harry, I intend to leave you all I have got, so that you may cut a figure in the world. You are like your father in face and figure, and I love you on that account. He was more a man of the world than you are, or will ever become, I suspect. Let me tell you it is an important thing to know the world well. I do, and have no great respect for it in consequence; but I know how to manage it, and that's what I want you to do. You will have many opportunities in London; I must beg that you will not throw them away. You may be the possessor of a large fortune, and yet unless you know how to manage it, it may be of little use to you. Many a man, with three or four thousand a year, does more than others with thirty or forty thousand. I would have you also, Harry, pay every attention to the wishes of your guardian, Mr. Kyffin. He is a very respectable man, and will probably save money, and as far as I can learn, as he has no other relations of his own, he

will undoubtedly leave it to you. Thus I hope that you may be very well off. Still both Mr. Kyffin and I may live for a good many years. When he last called for you in London I examined his countenance, and considered him a remarkably hale and healthy man, while I myself feel as well as I ever did in my life. However, I don't wish to think of the time when you will come into my property."

Harry, of course, begged that the old lady would not think of such an event, and declared himself ready to enter some profession, by which he might make himself independent of the expected fortunes of his friends. He thought that he might like the law. Life in London and in dusty chambers was not exactly what he had been accustomed to, but still, where an important object was to be gained, he was ready to submit to anything. Lady Tryon laughed at the notion. He might certainly eat his dinners at the Inns of Court and live in dusty chambers, but as to making anything by so doing, the idea was preposterous. A young fellow like him, of good family and presentable appearance, must marry an heiress. He was fit for that, and nothing else.

Harry saw that there was no use discussing the matter with his grandmother. He resolved, however, to talk it over with his guardian as soon as they met. He saw that the old lady had some project in her head, which she had resolved to keep secret from him. It must be confessed, he was very glad when her ladyship rang for Betsy Frizzle, and retired to her room. They arrived next day late in the evening at Lady Tryon's house, in the middle of — Street. Harry set off the next day to visit Mr. Roger Kyffin, of Hampstead. He found that the coach ran twice in the day to that far-distant suburb. It was a pleasant drive, among green fields, here and there a smiling villa, but otherwise with few buildings. Mr. Kyffin had not come back from the city when Harry arrived, but his careful housekeeper received him with every attention, and insisted on his partaking of some of her preserves and home-made wine, just to give him an appetite for supper, as of course her master always dined in London.

At last Mr. Kyffin arrived. He was much pleased with Harry's appearance. They spent a very pleasant evening. Harry could not help contrasting the conversation of his guardian with that of his grandmother—the man of business, so unworldly, and with a heart so full of warm affection, anxious for the welfare of his fellow-creatures, while the old lady with one foot in the grave was truly of the earth—earthy. Harry did not exactly say as much as this to himself, but he felt it, notwithstanding. Roger Kyffin was very much pleased to hear of Harry's wish to enter a profession. "I would not have you decide in a hurry," he said, "and you must consider for what you are best fitted. You know that I, as far as I have the power, will help you to the utmost—on that you may depend. Further than that, Harry, I don't wish to bias you." Harry slept at Mr. Kyffin's, a pretty little cottage, and accompanied him the next day back to London. He found that the mornings hung somewhat heavily on his hands; the evenings, too, were not spent in a way particularly agreeable to him, as Lady Tryon insisted on his accompanying her to the routs and other parties she frequented. He had a dislike to cards, and could never learn to play, so she had not insisted on his joining her, but she spent the whole of the evening at the card-table. He saw,

however, from the piles of gold placed before her that she was playing high; how high he could not tell; but very often she returned home in an unusually bad humour, when he found it safer to keep silence than to attempt any conversation with her.

At this time, ladies of fashion, as well as gentlemen, were fearfully addicted to the vice of gambling. The law was doing its utmost to put down public hells, but it was unable in general to stop the practice in private houses, in consequence of the difficulty of obtaining evidence.

One evening Lady Tryon had been at the house of the Countess of Buckinghamshire, to which Harry had, very unwillingly, been compelled to accompany her. As usual, gambling went on, a gentleman of fashion keeping the faro-table. Harry saw by the expression of his grandmother's countenance that she was a heavy loser. The more she lost, the higher stakes she seemed inclined to play for.

"Let the old lady have her way," he heard a gentleman near whom he was standing observe, "a little bleeding will do her no harm."

The Countess's handsome rooms were full of people of rank and fashion. Tables were scattered about on each side with eager players, some engaged in cards, others casting the dice, while others stood round staking considerable sums on the turn of a card or throw of the ivory. All of them seemed brought together by one absorbing passion, which they shared with the stockbrokers of Change Alley and the frequenters of the lowest hells. A few like Harry might have been compelled to go there against their will—young daughters to attend their

mothers, who were leading them into vice, and a few like Harry who had no money to stake. As he looked at the group of excited beings with sparkling eyes, the rouge cheeks of the ladies, with here and there a black patch to hide a blemish, or to set off the fairness of their skins; the haggard faces of the men, with their perukes pushed on one side, their lips puckered, pressed close together, many of them holding the cards with trembling knees, evidently with one foot in the grave, Harry could not help hoping that he might never become like one of them, and he longed once more to be back at Stanmore in the company of Mabel. He thought, too, of her dying cousin, for the last account which had been received gave no hopes of her recovery, and every day he expected to hear that she was no more. He was thankful when at length he received Lady Tryon's commands to order her coach. She was in a worse humour even than usual.

"Fortune won't desert me," she said at length, as they were nearing home; "there's another chance; I intend to purchase some lottery tickets: they can bring me through, though nothing else can, unless Harry, when you marry the little heiress you take care of your old grand-dame; you owe her something for bringing you up as a gentleman, for if I had not taken you up you would have been even now a merchant's clerk in the city! Faugh! that such should be the fate of a grandson of General Tryon."

Harry did not venture to remark that her ladyship's brother was a merchant, and probably had been a merchant's clerk in his younger days; however, he thought as much.

SIR WILLIAM THOMSON, F.R.S., D.C.L.

AT the meeting of the British Association held this month in the Scottish Capital, Sir William Thomson succeeds Professor Huxley in the office of president. Sir William Thomson takes rank as one of our greatest living mathematicians and natural philosophers. For his eminent scientific services in the improvement of submarine telegraphy, and in connection with the laying of the Atlantic telegraphic cable, he received in 1866 the honour of knighthood. Sir William was born at Belfast in 1824. His father, Dr. James Thomson, was at that time one of the professors of the Belfast College, but was in 1832 transferred to the Chair of Mathematics in the University of Glasgow, where he attained to a high reputation as an enthusiastic and successful teacher, and became also known as the author of an "Elementary Treatise on Algebra, Theoretical and Practical," and an "Introduction to the Differential and Integral Calculus." In a series of brief notices of the Glasgow Professors of his student days, the late Dr. James Hamilton, of London, makes the following pleasant reference to the father:—"As soon as Dr. James Thomson was brought over from Belfast, Euclid found an interpreter, and the chair of Robert Simson was rescued from its long disgrace. A more gentle, anxious, painstaking teacher could nowhere be found. Any solemn Highlander who appeared deeply 'exercised' about surds and unknown quantities was sure to enlist his sympathy, and a well-timed question at the close of the hour could scarcely fail to obtain an invitation to breakfast and an explanation of the binomial theorem."

William Thomson in the early prosecution of his mathematical studies, under the guidance of his "gentle and painstaking" father, had not a few advantages, which his zeal and talent readily turned to excellent account. Educated first at Glasgow College, he afterwards repaired to Cambridge, since the time of Newton celebrated as the seat of mathematical learning, and entered as a student of St. Peter's College. He graduated in 1845 as second wrangler and first Smith's prizeman, and shortly afterwards he was elected to a Fellowship of St. Peter's. This he held till his marriage in 1852 to Margaret, daughter of Walter Crum, Esq., of Thornliebank. When an undergraduate at Cambridge, Mr. Thomson gave proof of his talent for the mathematical treatment of problems in natural philosophy by the publication of several remarkable papers in the "Cambridge Mathematical Journal." An article on the "Motion of Heat" was contributed by him in 1842, the author being then in his eighteenth year. It curiously happened that most of the ideas contained in this article had been anticipated by other inquirers between the time of its preparation and its appearance in the journal. In 1845 Mr. Thomson assumed the editorial charge of the "Cambridge Journal," which from that time was issued on an enlarged basis as the "Cambridge and Dublin Mathematical Journal." Very many of the editor's earlier and striking contributions to scientific inquiry enriched its pages, and the journal became well known to the mathematicians of Europe. From these contributions a selection of papers on electricity is in pre-

paration, and will shortly appear in a separate volume.

In 1846, at the age of twenty-two, Mr. Thomson succeeded Dr. W. Meikleham as Professor of Natural Philosophy in the University of Glasgow. In the following year he became a Fellow of the Royal Society of Edinburgh, and soon afterwards also a Fellow of the Royal Society of London. To the former learned society he has communicated an extended series of valuable papers on the Dynamical Theory of Heat, and also original speculations on the cognate subject of Solar Heat. To the latter he has chiefly communicated his researches on electricity. A gold medal of the Royal Society was presented at the anniversary meeting in 1856, for "his various physical researches relating to electricity, to the motive power of heat, and to other subjects." On that occasion the president, Lord Wrottesley, referred "to the zeal with which Professor Thomson is inspired, to his clear apprehension of mathematical and physical truths, and his readiness in communicating his ideas, which has powerfully contributed to stimulate others in the pursuit of truth, and to direct them into right paths!"

The Keith prize of the Royal Society of Edinburgh for the years 1862 and 1863 was awarded to Professor Thomson, for his communication, entitled "On some Kinematical and Dynamical Theorems." The vice-president, Sir David Brewster, on that occasion made reference to his eminent colleague's varied labours and investigations. Sir David's interesting and eloquent summary we gladly transfer to our pages:—

"During the last seventeen years Professor Thomson has communicated many valuable papers to this society, which have added greatly to the value of its Transactions. These papers, and others elsewhere published, relate principally to the theories of electricity, magnetism, and heat, and evince a genius for the mathematical treatment of physical questions which has not been surpassed, if equalled, by that of any living philosopher. In studying the mathematical theory of electricity, he has greatly extended the general theorems demonstrated by our distinguished countryman Mr. Green,* and was led to the principle of 'electrical images,' by which he was enabled to solve many problems, respecting the distribution of electricity in conductors, which had been regarded as insolvable by the most eminent mathematicians in Europe. In his researches on thermo-dynamics Professor Thomson has been equally successful. In his papers 'On the Dynamical Theory of Heat' he has applied the fundamental propositions of the theory to bodies of all kinds, and he has deduced many curious and important results regarding the specific heats of bodies which have been completely verified by the accurate experiments of Mr. Joule. No less important are Professor Thomson's researches on solar heat, contained in his remarkable paper 'On the Mechanical Energy of the Solar System'; his researches on the conservation of energy, as applied to organic as well as inorganic processes; and his fine theory of the dissipation of energy, as given in his

paper 'On a Universal Tendency in Nature to the Dissipation of Mechanical Energy.' To these we may add his complete theory of diamagnetic action, and his investigations relative to the secular cooling of our globe, and the influence of internal heat upon the temperature of its surface." After referring to other works, Sir David added that "the important conclusions which he obtained from the 'Theory of Induction in Submarine Telegraphy' have found a valuable practical application in the patent instrument for reading and receiving messages, which he so successfully employed in the submarine cable across the Atlantic; and when that great work is completed his name will be associated with the noblest gift that science ever offered to civilisation. By his delicate electrometers, his electric spark recorder, and his marine and land reflection galvanometers, he has provided the world of thought with the finest instruments of observation and research, and the world of action with the means of carrying the messages of commerce and civilisation which have yet to cross the uncabled oceans that separate the families of the earth."

In presenting the Keith prize to Professor Thomson, Sir David further added, "I am proud to think that Scottish science has such a representative in the University of the West, while in our own (the University of Edinburgh) it has one of kindred genius and power." The allusion here made is to Professor Tait,* now holding the chair of Natural Philosophy in the University of Edinburgh.

The researches of Professor Thomson in electricity, begun at Cambridge, have been continued through a long series of years. Up to the year 1860, he has made to the British Association nearly thirty different communications on one branch or other of this department of science. His method of Electrical Images was first made known to the public at the meeting of the British Association, held at Oxford, in 1847; and is further expounded in the "Cambridge and Dublin Mathematical Journal," for 1850. To the Royal Society he communicated an account of "Researches in Thermo-Electricity," in May, 1854. And in the following year he made a contribution to the same body, "On the Theory of the Electric Telegraph." The investigations recorded in that paper it appears were commenced in consequence of a letter received by the author from Professor Stokes, dated 16th October, 1854, and were communicated to the Society before the full development of the mathematical parts was completed, as serving to indicate some important practical applications of the theory. The inquiry into which Professor Thomson was led by the letter of Professor Stokes was, it would appear, the point of transition from his more abstract researches in electricity to their practical applications in land and submarine telegraphy, by which he was afterwards to render signal services to the world, and to become more widely and popularly known.

The mathematical theory of magnetism, as developed by Poisson, was made to rest on foundations

* It is a curious circumstance in the history of science, that the researches of Green, in electricity, above referred to by Sir David Brewster, should have escaped the notice not only of foreign but even of British mathematicians. Green died at an early age, and his "Essay on the Application of Mathematical Analysis to the Theory of Electricity and Magnetism," privately printed at Nottingham, in 1828, was not seen by Thomson till 1845.

* Professor Tait, like his friend Sir William Thomson, was educated at St. Peter's College, Cambridge; and like him, too, attained to a fellowship of that college. He is the author of an elementary treatise on Quaternions, and of numerous papers published in the transactions of learned societies. Professors Thomson and Tait are at present conjointly engaged in the laborious task of preparing a treatise on Natural Philosophy. This treatise, one volume of which has been published, is one of the series of educational works issued by the delegates of the Clarendon Press; and when completed will embrace four volumes. It is the hope of the authors that their work will assist in introducing into university study and examination something like a complete course of natural philosophy.

in some respects too speculative. This subject was taken up by Professor Thomson, who in a lucid and satisfactory manner placed the theory on the basis of observed facts, so as to render it more independent of any ulterior suppositions which may be adopted respecting the nature of magnetism.

We regret that our space will not allow us to notice Professor Thomson's researches on the attractive and sublime subject of solar heat. The meteoric theory of the origin of the sun's heat was first propounded by Mayer, and afterwards independently by Waterston at the meeting of the British Association at Hull. It was subsequently modified by Thomson in his ingenious theory of vortex motion. But his main contribution to the meteoric theory has been his pointing out that the meteoric supply could not be perennial. In the present state of science, what he thinks most probable is Helmholtz's view, that the sun originally acquired its heat in being built up out of smaller masses falling together, and generating heat by their collision; but that at present it is simply an incandescent mass cooling. In a paper published in 1868, in the Transactions of the Geological Society of Glasgow, Sir William Thomson brought his conclusions regarding the amount and duration of the solar heat to bear upon the question of geological time, and found cause to call upon uniformitarian geologists to reform their estimates of the periods assigned by them for past changes on the globe. Professor Huxley, in his address to the Geological Society of London, in 1869, controverted some of the positions taken up by the Glasgow professor. Sir William has in his turn dealt with Professor Huxley's statements in a subsequent communication to the Glasgow Geological Society, which we regret is not more widely known.

A series of experimental researches by Professor Thomson relating to voltaic electricity formed the subject of the Bakerian lecture for 1856, delivered before the Royal Society. This important communication is entitled "On the Electro-Dynamic Qualities of Metals," and contains the discovery of the electric convection of heat in metals. This paper, with that "On the Rigidity of the Earth," also communicated to the Royal Society, and the series of papers on the Dynamical Theory of Heat, already referred to, are perhaps the most valuable of Sir William Thomson's contributions to learned societies. In 1856 there was also communicated by him a paper on the "Elements of a Mathematical Theory of Elasticity." Carnot, the French philosopher, developed the mathematical theory of the motive power of heat, assuming as an axiom the indestructibility of heat. The researches of Mr. Joule proved that heat and work are mutually convertible. A reconstruction of the mathematical theory of heat was accordingly required, and this task Professor Thomson accomplished in a series of papers, which form part of his valuable contributions to the Philosophical Transactions, and to the Proceedings of the Royal Society. We may here refer to his two kindred articles, one "On the Thermo-Elastic Properties of Matter" in the "Quarterly Mathematical Journal," for April 1855, and the other "On Thermo-Magnetism and Thermo-Electricity" in "Nichol's Cyclopaedia" (Edin. 1860).

There are also two conjoint papers by Joule and Thomson, in the Philosophical Transactions "On the Thermal Effects of Fluids in Motion," and "On the Alterations of Temperature accompanying changes of Pressure in Fluids."

On the subject of the Atlantic telegraph, Professor Thomson delivered a popular lecture on the occasion of the meeting of the British Association at Dublin, in 1857; and at the request of the Council of the Royal Society of Edinburgh he also gave an address "On the forces concerned in laying and lifting deep-sea cables." This address was reprinted by the promoters of the undertaking to lift the lost end of the 1865 cable, and to complete the line; and 11,000 copies of it were circulated in the spring of 1866. In an article written by him on the electric telegraph in the "Encyclopaedia Britannica" he has given a description of the instruments invented by himself, and used in laying the Atlantic cable, together with an account of the first expeditions of 1857 and 1858.

The month of August, 1858, will ever be memorable in history. In that month the world's news was for the first time read on the same day in the capitals of Europe and America. As the time for laying down the cable of 1858 approached, difficulties of a formidable character were experienced in the electrical department; and Professor Thomson consented to go out in the "Agamemnon," and occupy the place of acting electrician. After the cable was laid, he remained at Valentia, and perfected that wonderful instrument known as Thomson's galvanometer, which combines extreme delicacy and simplicity of construction, with a large visible range of observation presented to the eye. By this instrument a ray of light reflected from a tiny mirror suspended to a magnet, travels along a scale and indicates the resistance to the passage of the electric current through the cable by the deflection of the magnet, which is marked by the course of this speck of light. If the light of the mirror travels beyond the index or out of bounds an escape of the current is taking place. From the failure of the cable to communicate in October, 1858, until the great enterprise was finally achieved, Professor Thomson was actively engaged with the subject of deep-sea telegraphy; and both by advice and action has exerted himself to the utmost to perfect the system of telegraphic communication. He accompanied the subsequent expeditions of 1865 and of 1866, and shared, as he had a right to do, in the honours conferred on those whose labours, energy, and skill had accomplished the great undertaking. The animating spirit of the enterprise was Mr. Cyrus Field, upon whom, as an American citizen, the British sovereign could confer no honour. To Mr. Field, Professor Thomson wrote on the eve of the final triumph—"My dear Field, I cannot refrain from putting down on black and white my hearty congratulations on your great success. Few know better than I do how well you deserve it." In brief notices of the *personnel* of the expedition of 1866, Sir William Thomson is referred to as "the very genius of electrical science, both from his knowledge of the subtle element to be brought into play, and the enthusiasm he brings to its study."

A more recent invention of our ingenious philosopher, the syphon-recording instrument,* was exhibited

* This remarkable instrument writes down in ordinary ink every fluctuation of the electric current received at the end of a submarine cable, and is likely to replace everywhere the mirror galvanometer, by which hitherto all messages through long cables have been received. The older instrument shows every change by the waving backwards and forwards of a little spot of light, leaving no trace of its wayward motions. The new instrument receives and indicates everything already indicated by Sir William's earlier invention, and writes indelibly. This is accomplished without any sacrifice in the sensitiveness of the instrument. A very fine glass syphon waves to and fro over a running strip of paper without touching it, and from this syphon ink is spurted on to the paper

for the first time in England at the opening of the British Indian Submarine Telegraph, when the Prince of Wales was present. In virtue of improvements recently made, this instrument is now beginning to supersede the "mirror telegraphic galvanometer."

Sir William Thomson's researches in electricity brought him into intimate contact and sympathy with Faraday.

Shortly after the death of Faraday, Sir William Thomson, when presiding over the section of mathematics and physics, at the Dundee meeting of the British Association, in 1867, referred to the great loss which the world of science had sustained. "I wish I could put into words," said Sir William on that occasion, "something of the image which the name of Faraday always suggests to my mind. Kindliness and unselfishness of disposition, clearness and singleness of purpose; brevity, simplicity, and directness; sympathy with his audience or his friend; perfect natural tact and good taste; thorough cultivation! All these he had, each to a rare degree; and their influence pervaded his language and manner, whether in conversation or lecture. But all these combined

make only a part of Faraday's charm. He had an indescribable quality of quickness and life. Something of the light of his genius irradiated his presence with a certain bright intelligence, and gave a singular charm to his manner, which was surely felt by everyone, from the deepest philosopher to the simplest child, who ever had the privilege of seeing him in his home—the Royal Institution. That light is now gone from us; while thankful for having seen it and felt it, we cannot but mourn our loss, and feel that whatever good things may be in store for us, *that light we can never see again.*"

We have only to add that a number of Sir William Thomson's contributions to science—scattered as they are over the transactions of learned societies and journals, English and foreign—are not enumerated in our notice of his labours; but enough has been cited to convey some knowledge of his high rank as a mathematician, an experimental philosopher, an original discoverer, and an inventive genius. Among other honours he has received the freedom of the City of Glasgow; the degree of LL.D. from the Universities of Cambridge and Dublin, and that of D.C.L. from the University of Oxford.

FIRST IMPRESSIONS OF AMERICA.

BY THE EDITOR.

CHAPTER XXI.—A CHAPTER OF AMERICAN POLITICS.



Y visit to Washington being at the dull season, I had no opportunity of seeing notable politicians* or hearing party debates. But I had time to make some observations on the general principles of the United States government.

I spent one morning in looking through the published acts of Congress, the national statute Law of the Republic. The whole are comprised in a series of about twenty volumes octavo. One volume is wholly occupied with Indian affairs, and the historian and ethnologist will find here ample materials for studying the relations of the Red and White men from the beginning till now. Another volume records all financial transactions, including grants of money or land; and in turning over its pages I found interesting records about Washington, and Lafayette, and Kosciusko, and Kossuth, and other historical notables.

But apart from matters of curious interest, the inspection of the Acts of Congress showed me how small a part the central power holds in the actual history and life of the American nation. The basis of social and political life is the "township," or "Commune," with local independent government. The legislation for these communities belongs to the State governments, and the State laws represent local

customs and usages, on the foundation of English Common Law. The good old Anglo-Saxon institutions thus flourish on American soil, and the hosts of immigrants, of all creeds and nationalities, have to conform in civil and municipal life to the good and free institutions of the country, a wonderful transformation to many of them.

Excluding all the legislation that has arisen out of slavery, and out of war, and out of tariffs and other interferences with free trade, the Acts of Congress shrink into small dimensions. If the good times could come of universal peace and universal freedom, including freedom of commerce, the central government of the Republic would have comparatively little work to do. For individual happiness and for social well-being, the separate communities and the State governments could provide, without any Congress at Washington, the elections for which bring disturbance throughout the Union, and must often be found a bore instead of an advantage.

But that good time is not yet. Besides matters of common interest, such as judicial and postal arrangements, there are questions that require united force, for which the separate States would not have enough power. For instance, the Northern free States might have saved themselves vast expenditure of money and of precious lives if they had left the Southern States to regulate their own institutions. On selfish grounds many might gladly dispense with central or federal government; but for the welfare of the whole nation, and for the progress of truth and right, the stronger the national government is, the better for America and for all the world. There must be a central power and a standing army to enforce obedience to that power, whether against rebellious States, as in the great war, or against Mormon or Indian lawlessness, and other contingencies.

A Southern gentleman told me that the Confeder-

by a series of electric sparks, these sparks being generated by a peculiar induction machine. This fine rain leaves a trace of the position of the siphon at every instant, in a fine continuous line. The siphon follows faithfully the rise and fall of the received current, and these alternations are arranged so as to form an alphabet, as in the usual single-needle instruments. The rain of ink opposes not the slightest resistance to the free motion of the siphon.

* I heard from good sources many proofs of the corruption and venality of public men, strange anecdotes also about wire-pullers and office-seekers, not only at Washington but in various State legislatures. But I refrain from dwelling on these abuses. They are things not peculiar to American institutions, though certainly too prevalent in the United States, owing to the strife of party, and the leaving so much to the management of professed "politicians," a larger class than the electioneering "agents" with us.

rates were all surprised at the patriotic enthusiasm evoked in defence of the national flag when the war of secession was declared. They thought that the advocacy of States' rights would have neutralised this feeling. But now more than ever Federal union is a first principle, and the national flag has more power than before. And well for the world that it has. With the British Union flag may the "Stars and Stripes" ever be in close alliance! There may be need for their joint action in China and the East, if nowhere else. The alliance with France is an unnatural one compared with this. The Crimean war, for instance, arose out of squabbles between the Greek Church and the Romish Church about the Holy Places, and never had any higher principle than maintaining the Mohammedan empire of the Turks. We have wasted countless lives, and incurred vast debt, in vain attempts to maintain "the balance of power," or to uphold ungrateful dynasties in Europe. The alliance of America and England can never be for such miserable purposes, but for worthy objects of freedom and civilisation through the world. Therefore, though the predominance of States' rights over central government might be better for the Americans alone, for the good of the world we hope for increase of the federal power of the great Republic.

This leads me to say a few words about political parties in the Union. There now are really only two great political parties, the Ins and the Outs. At each quadrennial election there is a universal scramble for office, including "loaves and fishes," as well as honours. For it must be remembered that each new government implies the removal of scores of thousands of office-holders, from the highest to the lowest functionaries, at home and abroad. This is the worst and weakest point in the whole American system as now worked. It makes all people strive for party instead of the Commonwealth. It is not an essential part of the Constitution, dating only from the time of President Jackson. The sooner it is changed the better for the Republic.

I repeat that the only true parties now are the Ins and the Outs. Nominally, the Democrats and Republicans are at present the candidates for office. But there is no sharp division between these opponents. Many Democrats hold the same principles as the Republicans on some points, and not a question can be raised that has not advocates among either side. The Republicans of the West do not like the high tariff and protection ticket of the Republicans of the East. The Democrats of the West, lovers of Union and of freedom, have nothing in common with the Democrats of New York and the Border States, who sympathised with the slaveholders, and carried the disastrous slavery compromises. These compromises involved the free States in the calamities and "judgments" of the war. The Republican party saved the country by its high principles, and it is sad now to see it opposed by Democrats, many of whom were with it in defending the Union, merely because they must have their turn of office. If the good men of both the Republican and Democratic parties were allied, they could form a great and strong government, comprising the best statesmen and administrators of the nation, and be able to resist the evil influences, through Irish vote or other, which weaken the Commonwealth, through the division of true Americans. There would be progress then in all matters of social and political welfare, whereas

now there is sheer waste of power in the party strife of the Ins and the Outs.

But I must refrain from further reflections, and continue my narrative.

CHAPTER XXII.—PHILADELPHIA—ASSOCIATIONS OF PENN AND FRANKLIN—THE STATE HOUSE—HOMES OF THE WORKING CLASSES—PHILADELPHIA AND GLASGOW COMPARED—CHURCHES—THE PRESS—THE PHILADELPHIA LEDGER.

AT Philadelphia, as at Boston, I was upon old classical and historical ground. The memories of William Penn and Benjamin Franklin, of the Founders of Pennsylvania and the Fathers of the Republic, haunt the place. The first English settlement here was not, as elsewhere, achieved by violence and treachery, but by amicable arrangement with the Indian possessors of the soil, and a blessing seems to have descended upon the successors of the early peaceful settlers. Even during the troubles of the Revolution the city escaped the horrors of war. Except the brief occupation by the British troops after the battle of Germantown, the patriots retained possession of Philadelphia, the centre of their influence and the seat of their Councils. It was in the State House that the Declaration of Independence was drawn up and the first Congresses held. The venerable building remains, one of the consecrated shrines of which Americans and liberal Englishmen are justly proud. I lingered long and mused much in this room, and gazed with delight on the relics which are preserved in it. It is fitted as a sort of historical museum, with portraits, and maps, and other records of the early times of the city and of the Republic. Going through the central hall, we emerge on Independence Square, to the crowd assembled in which the "Declaration" was read, from the steps of the Court House, on the 4th of July, 1776.

My first stroll in Philadelphia was in company with the ghost of Benjamin Franklin. I remembered his account of his landing in Market Street Wharf, in his working dress, "unacquainted with a single soul in the place, and not knowing where to seek for a lodging." Walking from the wharf to Market Street, "I asked," he says, "in a baker's shop for some biscuits, expecting to find such as we had at Boston; but they made none of the sort. I then asked for a threepenny loaf. They made no loaf of that price. He gave me three large rolls. I was surprised at receiving so much. I took them, however, and having no room in my pocket, I walked on with a roll under each arm, eating the third. In this manner I went through Market Street to Fourth Street, and passed the house of Mr. Read, the father of my future wife. She was standing at the door, observed me, and thought with reason that I made a very singular and grotesque appearance." This is the first peep of Franklin's Deborah, whose portrait may be seen in the State House among people more truly great than kings and queens. The two spare loaves went to a poor woman on the quay, and then, says Franklin, "I joined a number of well-dressed people all going one way, and was thus led to a large Quakers' meeting-house near the market-place. I sat down with the rest, and after looking round me for some time, hearing nothing, and being drowsy from my last night's labour and want of rest, I fell into a sound sleep. In this state I continued till the assembly dispersed, when one of the congregation had the goodness to awake me. This was

consequently the first house I entered, or in which I slept, in Philadelphia." Another kind Quaker recommended him to a house of good repute, the "Crooked Billet" in Water Street, his first lodging-place. The voyage had been made in consequence

Walnut Street, Second Street, Fourth Street, as well as a great number in Chestnut Street, had papers in them signifying that they were to be let, which made me think at the time that the inhabitants of the town were all deserting it one after another."



THE COURT HOUSE.

[In the room to the left on entering the Hall the Declaration of Independence was signed.]

of William Bradford in New York saying his son George, the printer in Philadelphia, might probably give him employment. George had no need then for a journeyman, and recommended him to the only other printer in the place, one Keimer, whose "printing materials consisted of an old damaged press and a small fount of worn-out English letters."

Such was Franklin's first start in Philadelphia, and such the condition of "printing and the press" a hundred and fifty years ago! Long afterwards Franklin often referred to these days, and when prosperity began to dawn on the town he thus wrote: "When I first paraded the streets of Philadelphia, eating my roll, the majority of houses in

How strangely this reads now! and more strange to think that this friendless printer lad rose to be not only the first man in Philadelphia, but is coupled with Washington as one of the chief founders of the Republic, and has left a name honoured through all the world among the great and good.

This is not the place to say more of Franklin's life. I suspect his writings and especially his "Autobiography" are not known as much as they ought to be among English working men, although his name is so often quoted. One thing only I must mention—above all his literary, and scientific, and political fame—in his old age he was president of two societies established in Philadelphia, one a

"Society for alleviating the miseries of public prisons," and the other a "Society for promoting the abolition of slavery, the relief of free negroes unlawfully held in bondage, and the improvement of the condition of the African race." His last public act was signing a memorial, 12th Feb., 1789, to the House of Representatives of the United States for discouraging the slave trade.

I need scarcely say that I beheld with veneration all the scenes and localities associated with his name. His grave, a plain, unadorned spot, is visited with reverence by all strangers. I went to it with a fellow-passenger in the "Scotia," a native of Philadelphia, Mr. Scull, a name unusual, but not new to me, his ancestor, Nicolas Scull, surveyor-general of Pennsylvania, being one of Franklin's early friends, and an associate in the Club called "The Junto." Mr. Scull introduced me to the Librarian of the Philadelphia Library, the descendant of the secretary of William Penn, and custodian of the Logan Library, which occupies part of the same building with the Public Library, of which Franklin was founder and president. In this venerable place I spent a pleasant morning, examining many of the old treasures of historical and literary interest. But I must dwell no longer on the antiquarian associations of the place, but proceed to describe my own first impressions of the modern city.

It was in the gloaming of a fine autumn evening I entered Philadelphia from Baltimore. On nearing the city there were signs of busy life in the iron-works and huge factory-like buildings, among which I remember was a wall-paper factory, said to be the largest in the Union. But the sight that impressed itself most that evening was the succession of rows of clean, neat, comfortable houses in the outskirts of the city. It was a striking contrast with the dingy, squalid tenements that fringe most of our English great towns. Entering London from almost any quarter, the comfortless, cheerless aspect of the "homes of the working classes" leaves a feeling of sadness on the mind. Remembering the scenes of poverty that meet the eye as the train approaches the terminus of the Great Eastern, South-Eastern, or other of our metropolitan railways, I was struck with the bright and cheery look of the approach to Philadelphia. This first impression remained with me, and was confirmed by after inspection of the homes of the working classes in this great American city. It is the one feature above all others which impressed me with satisfaction in Philadelphia. In traversing the city from end to end in the various street cars, and strolling in every direction, I always observed this as the marked characteristic of the place, that the operative class is better housed and lodged than in our cities. I found that this was the result of well-planned and well-carried-out "building associations." I was told by the master of one great establishment, employing about three hundred workmen, that a large majority of them belonged to a building club. In due time they would all, or nearly all, become proprietors of well-built and well-fitted four or six roomed freehold houses, with every convenience and comfort.

Much has been said about the "distressing neatness and symmetry" of the city. The streets are laid out in parallelogram blocks, forming rectangles like the squares of a chess-board. They are numbered from the Delaware River on the east, toward the Schuylkill River on the west, beginning with

Front Street, Second Street, Third Street, and so on, up to Twenty-third Street. The parallel streets running from west to east are chiefly named after trees, Chestnut Street, Walnut Street, Spruce Street, Cherry Street, and so on. Special names occasionally intervene, such as Market Street, Library Street, Washington Street, and in the newer parts of the city the street nomenclature is more irregular. From the centre of the town, Market Street, the numeral streets are divided, as into North Tenth and South Tenth streets. The numbering of the houses is also regular, odd and even on opposite sides, a hundred in each block or square, so that the first number, in Walnut Street, beyond Thirteenth Street, is 1301; the fifth beyond Ninth Street is 905. All this may be very "distressing" to artists and non-commercial travellers, but the inhabitants are the best judges, and the regularity is very convenient and useful, not only for sanitary supervision, but for postal, police, and other civic and municipal arrangements. As a general rule, it is with towns as with individual houses or cottages, the most picturesque to an artist's eye are often the least healthy and serviceable for residence. The flat, level site of Philadelphia has been used to the best advantage for the health and comfort of the vast population. Nor are the long rows of brick houses so monotonous-looking as might be anticipated, all the windows in the good streets having cheerful green outside shutters, and the doorways being white, often of beautiful marble. Many of the streets are also thickly lined with well-trained trees, and frequent squares and open places break the uniformity of brickwork. In the chief streets, especially Chestnut Street, one of the finest streets in America, the crowded pavements and magnificent shops leave little leisure for noticing the prosaic regularity of the place. The only fault is the narrowness of the roadways, admitting only a single line of tramway, the cars running up one street and returning down another. The beauty of the heights on the western and northern skirts of the town make up for the unpicturesqueness of the older districts; compensating also (in the health returns), by their salubrious sites, for the dense and unwholesome crowding in the Northern Liberties and other parts inhabited by the Irish and by the poorer classes, native and foreign.

The Irish Roman Catholics seem to swell in undue proportion the poverty of whatever place they inhabit. I made inquiries about pauperism and about the agencies, both public and voluntary, for its relief. Intemperance and indiscriminate charity are here as elsewhere the chief feeders of pauperism and mendicancy. Even with these drawbacks the condition of the poor in Philadelphia is satisfactory compared with our own great cities. The whole is well under the control of the authorities and of the benevolent societies. Except in two or three localities, I saw nothing approaching to the hopeless, squalid poverty of our great towns—of Glasgow, for instance, the city most fairly to be compared with Philadelphia, as Edinburgh is with Boston.

It would be useful to institute a comparison in detail, from the Census reports, of the relative condition of these great cities of the Old and the New world. The comparison ought to include sanitary and social as well as educational and religious statistics. My inquiries were too brief to venture on details, but the measureless superiority of Philadelphia over Glasgow in regard to the general well-

being of the masses is evident to any observant stranger who knows both places. The death-rate of Glasgow in 1869 was 34, that of Philadelphia 19. Of the 82,000 families composing the population of Glasgow, above 60,000 occupy dwellings of one or two apartments only! At the census of 1861, 28,000 families lived in single-roomed homes, and 32,000 in houses of two rooms. In Philadelphia there is scarcely such a thing known as a workman's family herding in this miserable way.

It is idle to say that there is vast difference in the conditions of cities in America, where all is comparatively new, and where there is plenty of room for the population. Neither Boston nor Philadelphia are new cities, and in the latter especially there is not much room to spare for building improvements. If the existing rights of ground-landlordism, or any other legal arrangements, hinder necessary amelioration of the working classes with us, it might be well to alter these things before the whole social structure is overthrown by the upheaval of Communism. But no violent changes are required. It has been demonstrated, even in crowded London, that decent and healthy homes for the working classes will pay at least five per cent. to builders, and far larger efforts ought to be made in this direction. Instead of leaving the matter to the speculation of individuals or companies, various public boards could effect much, not only to the benefit of the industrious poor, but to the advantage of all classes, as the poor-rates, police-rates, and other imposts could be lessened, and a vast amount saved to the whole community by improving "the domiciliary condition of the masses." Commissioners have been sent to foreign countries to report on far less important subjects, and it would be a wise and truly economical thing if some of our public bodies in London or Glasgow or elsewhere would send intelligent and practical men to report on the condition of Philadelphia. I repeat here my first impression that in no city of the world have the great masses of the people, and especially the operative classes, attained a higher average of well-being, in sanitary and social as well as in educational and religious life.

Of possible disasters from Communism and other upheavals from below, such as have convulsed Paris and may threaten London, there is no fear in Philadelphia, a larger city than any in Europe, except London and Paris. The lower strata are sound there, the dregs at bottom and the froth at top forming but a small proportion of the vast mass of social life.

These two facts of the great death-rate and the overcrowded dwellings suggest all other contrasts, both of a physical and moral kind. Lord Shaftesbury, speaking of London, and the remarks apply to Glasgow and all large towns, said: "I maintain that the grave and leading mischief is the domiciliary condition of the large masses of the people. I have seen as many as twenty persons living in a single room; and is it possible, I ask, when such cases not only exist, but abound, to institute purity of life, of thought, of action, or observe any of the demands of domestic duty? This is the besetting evil that surrounds us all; this is the great and overwhelming mischief that is bringing corruption upon the population, which is one great cause of that which is the main curse of our country, habits of drinking and intemperance. The filthy physical state, the depression of the nervous system, the misery brought on by

that mode of life, drive people to find artificial stimulants in the beerhouses and the ginshops." There is no doubt that much of the prevailing intemperance is due to these physical causes, and it is too true that the habit, with all its deteriorating consequences, becomes hereditary in the children of drunkards. It is also unquestionable that to intemperance is due a vast proportion of the crime and the pauperism of overcrowded cities. Education and religion fail to effect their due amount of good influence, in the presence of causes tending physically and socially to degrade the masses.

But really, after all, the condition of the working classes depends less on what is done for them than upon what they do for themselves. By the common schools, by the Sunday schools, by the numerous churches, all voluntary, and to a large extent supported by the working people, by the cheap press, and free libraries, the American workmen of Philadelphia have raised themselves as a body to a higher standard than in any great city I have ever visited.

Whether this well-being is progressive, or whether it will last, I have no idea, speaking only from what I witnessed. To the old agricultural wealth of Pennsylvania, the finest farming and breeding ground in the Union, great mineral resources—coal, iron, and oil—have now been added. The trial of people by sudden increase of wealth is always severe, and there may be risk of Philadelphia losing its staid, sober, solid character, as compared with New York, for example. With wealth and luxury come many evils, which descend from the rich to other classes of society. If there is danger in this respect, I see equal watchfulness and activity for maintaining and extending what is good. There is no city more abundant in churches and schools, and in all useful and beneficent institutions. There are about 450 churches, though some of these can only be small stations. The Presbyterians, including Old and New Schools, Reformed, and United, number 110 churches, the Episcopalians 80, the Methodist Episcopalians 70, and the Baptists 40. The Roman Catholics return 40 churches and chapels, the Lutherans 30, besides 15 German churches, 6 Dutch Reformed, and 4 Moravian. The Friends, Hicksites and Orthodox, between them have 15 meeting houses, and the Jews 7 synagogues. The orthodox Congregationalists are not strong as in New England, having only 4 churches. The remaining churches belong to Universalists, New Jerusalemites, Unitarians, and other sects, all of whom form an insignificant proportion of the Philadelphia worshippers.*

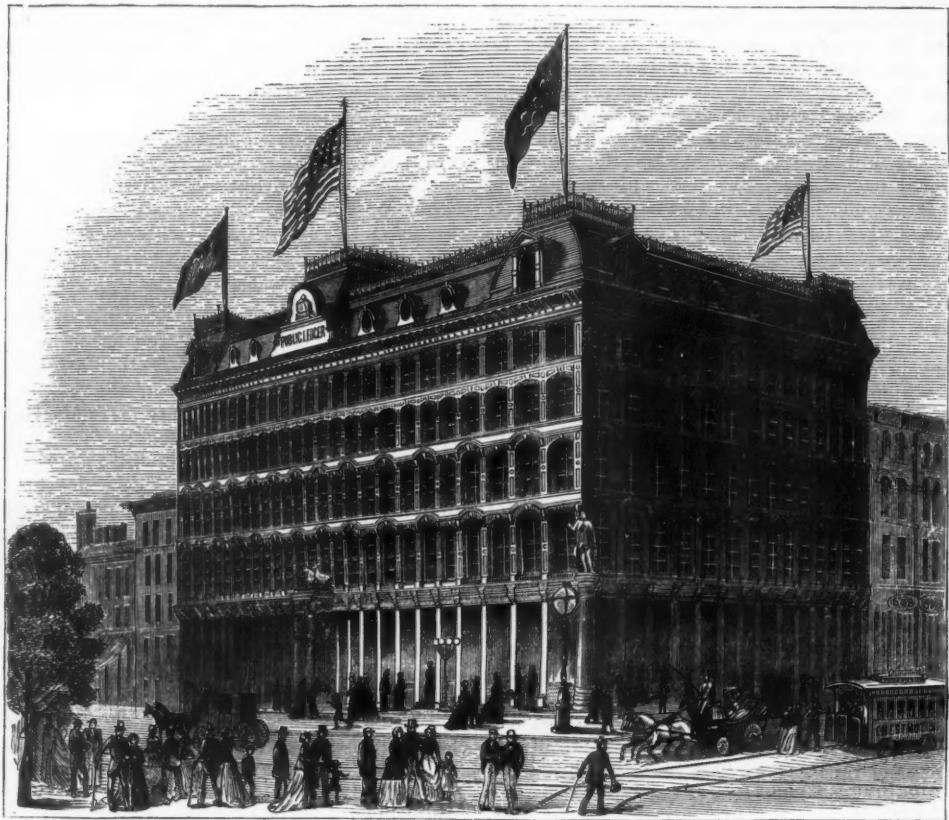
In like force appear the other great trainers of national character—the Schools and the Press. The Common Schools are all that could be expected in a State like Pennsylvania; and as to newspapers and journals, the number in the State is above six hundred, Philadelphia alone producing about two hundred periodicals of all kinds, class magazines and religious magazines as well as newspapers. The book trade also of Philadelphia is flourishing—at least if I may judge by what I saw and heard at the store of Lippincott and Sons, one of the largest book firms in the Union, in fact one of the largest in the world. From Mr. Lippincott I obtained much

* In most of the churches, as in all the great cities of the Union, the evil habit prevails of "praise by proxy." The "service of song" is too much left to hired vocalists.

valuable information, and have grateful remembrance of his courteous attention. Philadelphia is also the head-quarters of the Presbyterian Board of Publication, which honours this magazine and, still more, the "Sunday at Home," by frequent re-publication of stories and articles, showing such confidence in our judgment and orthodoxy as not even to think of consultation or acknowledgment! The Sunday School Union has also a large sphere of usefulness in publishing books for the young, as well as occasional works of a higher class, in the preparation of which the committee have the advantage of the aid of Dr. Allibone, author of the "Dictionary of Authors" and other standard books, one of the best respected literary men of America.

journalism, and as showing the career open to industrial enterprise, even in these days of keen competition.

Among the most conspicuous and imposing edifices in Philadelphia is the "Public Ledger Building," at the corner of Chestnut and Sixth Streets. I found it a common thing in the great towns for a successful newspaper to have a block of buildings bearing its name, part of the premises being occupied for its own use, and the remainder let off in offices and stores. The publicity of the site in such cases is sure to command high rents for such annexes to the main establishment. Several of these buildings in New York and Chicago I had inspected, but none of them approached in vastness and completeness that of the "Philadelphia Ledger." I have no space to



PUBLIC LEDGER BUILDINGS, PHILADELPHIA.

Of the United States Mint, of the Girard College, the Fairmount Waterworks, and other stock sights of Philadelphia, I have nothing special to say, and must refer for description of these, and of other public institutions, to the gazetteers and guide-books. The Park, three thousand acres of most varied surface, already promises to be the finest demesne of the kind in the world. Some of the buildings and establishments, both public and private, are on a scale of vastness which has given rise to a gentle Pennsylvanian joke, which speaks of "seeing the elephants," instead of "the lions," as elsewhere.

One mammoth establishment I select for notice, not only for its own attractions, but because it is full of interest, as illustrating the history of American

enter into details, but retain a lively impression of what is perhaps the largest, certainly the most perfect, printing and publishing office in the world. The machinery, the presses, the offices, the fittings, are all of the most perfect kind that modern skill has contrived. But beyond the mechanical wonders of the place, I was struck with the provision made for the health and the comfort of the workers. As an editor, I looked with admiration and envy at the commodious and well-furnished rooms in the editorial apartments; and, as to the composing room, no compositors in England work in such comfortable and wholesome quarters. Not only is there plenty of space and air, but in the very colouring of the walls to relieve the sight, and in the providing of

bath-rooms and other comforts, every care is taken of the health of the workmen. I am not surprised that the opening of such an establishment was celebrated by a public banquet at the Continental Hotel, when the Mayors of Philadelphia and New York, and many of the most distinguished public men in Church and State from all parts of the Union, assembled to do honour to the proprietor of the "Ledger," about whom and his paper a few brief notes will be read with interest.

The "Public Ledger" has long been known in this country as one of the most remarkable papers in America, remarkable in its origin and in its history. It was started in 1836 by three working printers—Swain, Abell, and Simmons, who clubbed together their savings, and worked with their own hands. It was not the first, but it was one of the earliest experiments towards a cheap press. The "opening address to the public" had in it the ring of success. Appealing to "the intelligence and love of improvement which pervade the population of Philadelphia," stating its claims on the mercantile and manufacturing community, and affirming its freedom from partisan principles, the "Ledger" proclaimed that "the common good is its object; and in seeking this object it will have especial regard to the moral and intellectual improvement of the labouring classes—the great sinew of all civilised communities." A clever New England barrister, Mr. Russell Jarvis, was engaged as editor, whose tact in taking advantage of current topics, and able leading articles, secured public attention. By the end of the first year the success of the paper was secured. The size was increased from a sheet 15½ by 21½, with four columns in the page, to 18 by 24, with five columns. The hand-press with which the work began was succeeded by a double-cylinder "pony" press. Several other cheap journals were now attempted, and the higher priced press was affected by a movement at first ridiculed and despised. The "Ledger" continued, however, to keep the lead. In the following years some exciting events, such as the "Abolition Riots of 1838," and the "Native American" movement culminating in 1844, brought the "Ledger" into increased prominence. On both of these questions the sympathies of the paper were rather on the side of the turbulent agitators, but when actual riots occurred its strong support of the supremacy of law and authority against mob rule gained the approval of all friends of order. Its influence at that time was so great that the despised "penny press" took a new position in public estimation. From this date the prosperity of the "Ledger" was progressive. In 1847 a four-cylinder rotary press was introduced, one of the first applications of Colonel Hoe's wonderful invention. The size of the paper had been gradually

enlarged to four seven-columned pages, 22½ by 34 inches. So it went on till 1864, when the high price of paper and of labour during the war brought financial trouble. Unable to agree as to increasing the price of the paper or the rates of advertising, the two surviving partners, Messrs. Swain and Abell, sold the property to Mr. George W. Childs, already well known as an enterprising book publisher. Mr. Childs proved himself equal to the crisis. The price of the paper was advanced to twelve cents weekly reduced after a short time to ten cents, the present price. The advertising rates were also advanced, and though there was at first a falling-off of subscribers, the defection was soon repaired, new elements of strength and popularity introduced, and the prosperity of the paper again secured. It has now reached a circulation of 75,000, and is acknowledged to be the ablest and best conducted, as well as the most influential paper in Philadelphia, and among the great powers of public opinion throughout the Union.

As the "Ledger" is one of the most remarkable papers, its present proprietor, George W. Childs, is among the most remarkable men in America. A native of Baltimore, he went to Philadelphia early in his teens, without a friend in the place, and with a few cents in his pocket. Beginning life as a boy in a bookseller's shop, by industry and frugality he gradually raised himself, till before he had reached forty years of age, he was one of the largest publishers, and proprietor of one of the richest newspapers in the world. For the goodwill, machinery, and whole "plant" of the "Ledger" he paid down a large sum in cash, and the property has fructified in his hands. The character of the paper has also improved, of which one proof may be given in the exclusion of all doubtful advertisements, however lucrative, and the insertion of which defaces too many of the leading American journals. There would be little satisfaction in recording the success of Mr. Childs if he were merely one of the many examples of successful millionaires. Fortunes are rapidly made in the States, but not often accumulated by plodding industry and self-denying thrift. Nor is it usual, though happily not uncommon, for such wealth to be used for unselfish and generous objects. One of his benefactions is the singular but sensible and practically useful gift of a burial-ground, in Woodland Cemetery, for the printers of Philadelphia. Mr. Childs has gained for himself a good repute and the respect of his countrymen, by his public spirit and his untiring beneficence. He is earning a name worthy of being mentioned in the annals of his country with that of Franklin for successful industry, and with that of Peabody for practical philanthropy.

THE BANYAN AND PEEPUL TREES OF INDIA.

BY THE REV. ROBERT HUNTER, M.A. (LATE OF NAGPORE).


T may help home readers to conceive the romantic character of India when it is mentioned that the genus *ficus*, or fig-tree, is there so numerous in wild species that it perplexes botanists, like the *salices* (willows) in England, or the *carices* (sedges) in the more northern parts of Britain. It is generally considered a favourable symptom of our London climate that one des-

cription of fig tree—that with eatable fruit (*Ficus carica* of Linnaeus)—is common in the open air. In our Eastern Empire, however, so far back as about forty years ago, when Dr. Roxburgh published his "Flora Indica," fifty-five species were described, and new forms are still being continually brought to notice. Fifty-five constitute somewhat more than a third of the species (about 160) known throughout the world. But the reader must not take up the

notion that at least fifty-five totally diverse kinds of fig-fruits, extending through all the degrees, positive, comparative, and superlative, of lusciousness, are to be had for the plucking in the Oriental jungles. We never heard of an eatable fig in the East, excepting the species well known at home, and even it was not found outside of gardens. Most of the wild figs had round fruits about the size of cherries, and preserving also this remote analogy to cherries that some were red and others black, the former being the more common colour. In internal structure, however, the fruit was as diverse from a cherry as it well could be. It is the object of the present article to describe two remarkable species of Indian fig-trees—the Banyan (*Ficus Indica* of *Linnaeus*), and the Peepul (*Ficus religiosa*), of the same naturalist.

The banyan tree is truly indigenous in India. It grows in a state of nature, as Roxburgh alleged, about the skirts of the Circar mountains. Nearly all the specimens, however, with which the traveller meets, occur in the vicinity of villages, where they have evidently been planted for shade. The writer of this article has often spent the hot part of an Indian day under a banyan tree at some Indian village or other; and on a certain occasion he slept under one during a winter night without any protection overhead except the branches, and sustained no injury through the exposure.

When a banyan tree first springs up from seed its method of growth is very much like that of the trees with which we are familiar at home, the oak or beech, for example. Nor does it begin to do anything out of the ordinary routine of vegetable life till it has reached a goodly size. Readers are all familiar with the fact that our British trees vary a great deal in the length of the branches which proceed from the parent stem, as also in the angle at which they send the branches forth. The oak, for instance, has what may be called long arms, and which, moreover, leave the parent stem at so high an angle that, speaking loosely, they may be said to be horizontal. The banyan tree of India has a length of arm with which that of the oak is not at all to be compared, the direction being almost quite horizontal. But on the ordinary principles of mechanics, the longer that such a branch is, the greater the lever power which it exerts, and which tends to break it off from the parent stem, so that a length of arm much exceeding that of the oak is impossible, unless some provision exists for giving it adequate support. The peculiarity of the banyan tree is that there is such a provision. When a horizontal branch has been put forth to such a length as to render it difficult to maintain itself without breaking, it lowers down from its end one or more roots, which, entering the ground, send forth rootlets and themselves become new stems. In due time the long horizontal branches which once were in danger of being destroyed by their own weight, are almost as easily supported by the woody pillars at either end of them as a chain bridge is on its piers, and no catastrophe is likely to occur even if new branches be sent forth. So the process goes on, and on, and on, till in place of a single tree there is a perfect colonnade of wooden stems supporting an adequate number of natural rafters, on which reposes a dense canopy of foliage. Dr. Roxburgh saw a banyan fully five hundred yards round the extremities of the branches, and about one hundred feet high. The principal branch of this monster was about eight feet or more in diameter, and rose to an

elevation of twenty-five feet before coming to the level of the branches. The size of the colossal banyan now described may be understood, if it be remembered that five hundred yards or fifteen hundred feet are more than a quarter of a mile, a pretty respectable circuit for the branches of one tree. But a more notable one still has long been known—that which was described with admirable minuteness and fidelity by Mr. James Forbes in his letters written from the East and published in his valuable "Oriental Memoirs," sent forth in 1813. It has a native name, Cubbeer Burr, given it after a celebrated saint. Was this the well-known Hindoo reformer Kabir or Kubbeer, from whom the sect of the Kabir Panthis took its origin? It grows about twelve miles from the town of Broach, on one of the banks of the Nerbudda river. Its circumference, when Mr. Forbes used to encamp with picnic and other parties under it, was nearly two thousand feet measured round the principal stems. The overhanging branches covered a much larger space. The large trunks numbered about three hundred and fifty, and the smaller ones exceeded three thousand, each of these, be it remembered, continuing still to send forth branches and hanging roots, designed to infix themselves in the earth and become the parents of a future progeny. Mr. Forbes says that this celebrated tree was once much larger, but that a fearful storm, attended by a sudden and high flood on the Nerbudda (occurring of course previously to the letter on which this information is given, dated January 1783), greatly diminished its glories, having carried away many of its trunks, thus reducing their number from more than 1,350 to the three hundred and fifty existing now. Birds, snakes, and monkeys, abound in the overhanging canopy of branches and foliage, the last-named animals amusing with their antics the European and native travellers encamped below. Mr. Forbes says that the great banyan

"Was much resorted to by the English gentlemen from Broach. Putnah was then a flourishing chiefship, on the banks of the Nerbudda, about ten miles from this celebrated tree. The chief was extremely fond of field diversions, and used to encamp under it in a magnificent style; having a saloon, dining-room, drawing-room, bed-chambers, back-kitchen, and every other accommodation, all in separate tents; yet did this noble tree cover the whole; together with his carriages, horses, camels, guards, and attendants, while its spreading branches afforded shady spots for the tents of his friends, with their servants and cattle. And in the march of an army, it has been known to shelter seven thousand men." (Oriental Memoirs, vol. i., pp. 27, 28).

A yet more interesting description, the value of it arising from its antiquity, is to be found in "Arrian's History of India," published in the second century of the Christian era, at or about the time when the Emperor Hadrian was on the throne. The authority on which Arrian described the banyan was that of Nearchus, who, as admiral, conducted the fleet of Alexander the Great from the Indus across the Arabian Sea to Babylon, in the year B.C. 324. Speaking of the Indian castes, Arrian uses this language: "These sophists spend their time in a state of nudity. During winter they bask in the open air, and when in summer the sun becomes hot in the fields and moist places, (then) under vast trees, whose shady character Nearchus describes, (adding that) they extend to five acres in circuit, and that 10,000 men could easily shelter themselves under the shade of one of these trees, so great is their magnitude" (See "Arrian's History of India," chap. xi.).

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From a Photograph.

BANYAN TREE, GALLE ROAD, NEAR COLOMBO, CEYLON.

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Need it be stated that a member of the vegetable kingdom at once so amazing in magnitude and so abnormal in its mode of growth, no sooner became known in modern times than it began to be pounced upon by the poets as their legitimate prey? Milton set the example, and in describing in his "Paradise Lost" the sewing of the fig-leaves together by our first parents after the fall, he called up before his mind's eye, not the ordinary edible *ficus*, but the banyan tree. We quote the passage, merely premising that *he* in the first line refers to Adam:—

"So counsel'd he, and both together went
Into the thickets; there soon they chose
The fig tree; not that kind for fruit renown'd,
But such as at this day to Indians known
In Malabar or Deccan, spreads her arms,
Branching so broad and long, that on the ground
The bended twigs take root, and daughters grow
About the mother tree, a pillar'd shade,
High, overarch'd, and echoing walks between;
There oft the Indian herdsman, shunning light,
Shelters in cool, and tends his pasturing herds
At loopholes cut through thickest shade; those leaves
They gather, broad as Amazonian targe,
And with what skill they had, together sew'd,
To gird their waist, vain covering, if to hide
Their guilt and dreaded shame."

Paradise Lost, Book ix.

Milton, whose poems are quite an encyclopædia of the knowledge current in his time, has here described the banyan in the main admirably. There are, however, two features in his sketch that call for remark. Without absolutely denying that the Indian herdsmen may occasionally cut "loopholes through the thickest shade" of the banyan trees under which they shelter themselves from the sun, we would still venture to observe that during some years' residence in India we never knew a case of such procedure. But letting this pass, as, after all, negative evidence is of little value in such a case, it may with confidence be affirmed that Milton was quite in error in asserting that the leaf of the banyan is "broad as Amazonian targe." He seems to have hastily leaped to the conclusion that because the tree was of colossal size its foliage would probably be framed on a gigantic model. This is not the case. The leaves of the banyan, which are somewhat oval in form, and pointed at the tip, are about six inches long, by three, or at most four, in breadth. When young they are downy on both sides; but when old they become smooth, and somewhat remind us of the leaves of some rhododendrons. Minute comparison, however, shows that while in the rhododendrons the nervures and reticulation of the leaves are generally not very conspicuous, it is different with the banyan leaves, which when old exhibit every nervure and all the minute network of their structure almost as distinctly as some of those skeletons of decayed foliage occasionally found lying under trees in autumn. A rhododendron leaf no one would ever compare to a broad Amazonian targe or shield.

There is an excellent description of the banyan also in that weird and not very attractive poem, Southey's "Curse of Kehama."

"'Twas a fair scene wherein they stood,
A green and sunny glade amid the wood,
And in the midst an aged Banian grew.
It was a goodly sight to see
That venerable tree,
Far o'er the lawn, irregularly spread,
Fifty straight columns propt its lofty head;

And many a long-depending shoot,
Seeking to strike its root,
Straight like a plummet, grew towards the ground.
Some, in the lower boughs which crost their way,
Fixing their bearded fibres round and round,
With many a ring, and wild contortion wound;
Some, to the passing wind at times, with sway
Of gentle motion swung;
Others of younger growth unmoved, were hung
Like stone-drops from the cavern's fretted height;
Beneath was smooth and fair to sight,
Nor weeds nor briars deformed the natural floor,
And through the leafy cope which tower'd it o'er
Came gleams of chequer'd light.
So like a temple did it seem, that there
A pious heart's first impulse would be prayer."

Canto xiii. (the Retreat.) v. 5.

All this is very accurate, even to the minute point that weeds and briars, by which latter term we suppose Southey meant thorny jungle shrubs (the briar does not grow on the Indian tablelands), were not to be found under the banyan. The only feature of the description at all unnatural is the speaking of the huge tree, and the fifty straight columns as occurring within the wood. A more suitable locality wherein to have placed it would have been the vicinity of a village. But making all allowances for these minute points, Southey's description must be highly commended. Moore, also, in his "Lalla Rookh," speaks in one place of the "pillared shade" of this tree, and describes it in the prose connecting links between the poetic portions of that well-known romance.

The fruit of the banyan is round in appearance, like a bright red cherry. It is eaten by monkeys, as also by parroquets, and other birds. Banyan means a merchant, and is not the native name of the tree. Probably its appellation was given by Europeans who considered that in its tendency to spread it resembled a mercantile establishment, while the natives more beautifully regard it as an emblem of the Deity. It would be a great acquisition to the scenery of Britain if the banyan could be introduced here; but we fear that it could not live through our severe winters.

The second species of wild fig tree which it was proposed to describe, is one considerably less romantic than that which has just occupied our attention, but an interesting species notwithstanding. It is the *ficus*, called in the several languages of India, which have close relations with the Sanscrit, *peepul*. Linnæus named it *ficus religiosa*, the sacred fig. It may at once be recognised by its leaves, which in place of being long and somewhat oval like those of the banyan, are heart-shaped and run into a long acumination, or needle tip. None of our common British trees have quite the same foliage as this. The nearest approach to the peepul leaf existing here is that of the black poplar (*Populus nigra* of Linnæus); but the poplar is broader than the other, has a blunter point, and minute serratures, while the peepul is only wavy. A curious analogy, however, exists between the poplar genus and the peepul in this respect, that both become agitated when even a feeble breath of air passes by. The fruit is black.

The *ficus religiosa* is often met with (planted or course) near Indian temples, though it is also to be found wild on mountains. It is, as its name imports, a sacred tree. Governor Rheede, who published at Amsterdam, in 1678, an excellent Latin volume, with fine figures, illustrative of

the plants which we met with in Malabar, describes it under the name of *Arcala*, and says: "This tree is sacred to Vishnu, whom these Gentiles report to have been born under it, and to have carried its flowers; and their religion requires them to adore it, to surround it with a wall of stones, and to mark either it, or the stones around it with a red colour, on which account it is called by the Christian inhabitants the devil's tree." It should be mentioned that the bedaubing of stones, and even idols, with red lead for purposes of worship, is still common over a large part of India.

The peepul manifests a strange propensity for destroying such walls as may happen to be in its vicinity. Its method of procedure is this. It commences by putting a tiny shoot through any crevice which it can find or make in the wall. In all likelihood the time it chooses for the commencement of this operation is the season of the year when the leaves, which are deciduous, have fallen, and not yet been renewed; for if they were standing, it would be sure to rasp them off, in forcing its way through the small holes, by means of which its passage must be effected. The shoot, of course furnished with leaf buds, having successfully penetrated through the wall, soon becomes clad with leaves; after a time also it lengthens and strengthens, till it becomes a goodly branch. But long before this stage of development has been reached, it has shattered the wall in all directions, while struggling to enlarge the hole, now become too small for its necessities. The writer of this article, when enjoying for a day or two the hospitality of an Anglo-Indian gentleman in the East, was surprised on entering the hall of his bungalow, where in this country overcoats, hats, and umbrellas would be put, to see projecting through the wall a long peepul shoot, luxuriantly clad with leaves. On his expressing some admiration for a spectacle so romantic, the gentleman, who was of course obliged to take a more matter-of-fact view of the circumstances, declared that he could not tolerate the shoot much longer, or his wall would go. A similar sight was subsequently witnessed in another place. An important fort in a native State had a gigantic peepul branch projecting from the centre of one of its sides, and the crevice through which it had come had been so well enlarged that cracks ran from it in various directions, like those one sees on a window pane, through which a small stone has been thrown. As a rule it is unpleasant to witness a building permitted through neglect to go prematurely to decay, but this latter case was an exception. The peepul tree would not have been allowed to pursue its course unchecked, had it occurred to the native authorities that the fort might again suddenly become of use for defence. The apathy with which they saw the slow destruction of a wall built originally for the protection of life and property, in the town adjacent, arose from the implicit confidence they felt in the ability of the British government to preserve order throughout the country; and little doubt can be entertained that when our Eastern empire for a moment tottered in 1857, the peepul tree which had so abused the previous tranquillity for its own evil ends, would be remorselessly cut down, and the wall which it had rent, again put in repair.

In Ceylon, even more than on the mainland of India, the banyan and peepul trees are regarded with veneration by the natives.

Varieties.

TOM THE ELEPHANT'S LAST TRICK ON BOARD THE "GALATEA."—When the Duke of Edinburgh's ship, the "Galatea," lay in Plymouth Sound, awaiting inspection by Admiral Sir H. J. Codrington, preparatory to paying off, and every officer and man was strenuously exerting himself to get "The Gal" as pretty as possible, Tom nearly neutralised all their efforts by indulging in an elephanthead luxury, covering his body with dust. Some one had carelessly left a can of red ochre (in powder) on the forecastle; this Tom found, and having well powdered himself, like a *belle* preparing for a ball, he rouged the newly-scrubbed quarterdeck, the ropes and capstan. Such a sight presented itself for the view of the commander of the ship next morning. Holystones and sand, lime and other appliances, were tried, but all in vain; the red stains in the wood grain could not be obliterated, much to the disgust of the officers whose duty it was to make the upper deck clean and shipshape. We hope that Tommy will keep out of mischief at Sandringham.

BLACKWOOD'S MAGAZINE ON COWPER THE POET.—We regret very much to find in "Blackwood" for June an article on William Cowper, which, while giving fair criticism of him as a poet, cruelly misrepresents his character as a man. At the same time, the old and often refuted charges about the pernicious influence of John Newton are reiterated. These charges have been usually made through misconception or hatred of evangelical religion, but this writer misrepresents the facts of the case. For instance, Cowper's engagement to Mrs. Unwin is ignored, though placed beyond question since the publication of Newton's Diary. We have requested Mr. Bull, formerly of Newport Pagnell, who knows from authentic records as well as from family traditions all the circumstances, to reply in detail in our next part to the misstatements of this writer.

RIGHTS OF EDITOR.—In an action lately brought against the Editor of the "Echo," for the value of an article sent unsolicited, the judge decided that articles so sent were at the disposal of the editor, who had the liberty of accepting or refusing; and that, if he gave notice to that effect, he had the right to destroy those which he did not accept.—*The Bookseller.*

STATUES OF STATESMEN AT WESTMINSTER.—It has been proposed to erect at Westminster, by means of funds subscribed, statues of the late Sir Robert Peel, Viscount Palmerston, and the Earl of Derby, and the Treasury requested Mr. Barry and Mr. Weekes, together with Mr. Fergusson, to report upon the subject. These gentlemen state that the two gardens opposite the gateways of New Palace Yard are the only open-air spaces at present available for the statues of statesmen in the neighbourhood of the Houses of Parliament; and that if the central avenue between these gardens were widened to twenty-eight feet, ten statues could be accommodated, five on each side of it, so as to form a pleasing and appropriate approach to the Houses of Parliament. While some of the pedestals would be unoccupied, they might be temporarily surmounted by vases to contain flowers. The four truncated angles of the square would afford suitable positions for eight more statues, and suggestions are made to prevent any incongruity or unpleasing effect while the number may be incomplete. The three gentlemen consulted are of opinion that the statues should, as general rule, be one half larger than life-size, inclusive of the plinth of about five inches, and that they should not all be of an uniform height, but that the same variety of height as exists in life should be, approximately, at least, retained. The pedestals should be uniform in dimensions and in design, and in accordance with the architecture of the surrounding buildings. It is considered that eight feet will be the best height for the pedestals. After the eighteen statues have been erected, which can be placed in Parliament Square Gardens, other sites may be available, after the clearances in Old Palace Yard and Abingdon Street.

INCOME PER HEAD IN ENGLAND AND IN INDIA.—The income of the United Kingdom had been guessed at about £800,000,000 per annum, or £30 as the average income of every individual in the United Kingdom, while the income of British India had been guessed at about £300,000,000, or say about £2 per annum as the income of every individual in British India.